

Atty. Docket No. CPAC 1013-1
Appl. No. 09/893,356

PATENT

12 3. (Amended) The package of claim 1 wherein a portion of the heat spreader overlying the semiconductor device protrudes downward toward the upper surface of the semiconductor device, and a corresponding portion of the mold cap is thinner between the upper surface of the semiconductor device and the heat spreader than more peripherally.

Please add the following new claim.

13 10. (New) The package of claim 1 wherein the heat spreader is entirely free of direct contact with the substrate.

REMARKS

Claims 1 and 3 are amended to improve clarity of presentation. The amendment to claim 1 is supported in the specification at, for example, paragraphs [0005], second line; and at paragraph [0025], second line and 8th and 9th lines. The amendment to claim 3 removes an editorial error. Claim 10 is newly added. The recitation of claim 10 is supported in the specification at, for example, paragraph [0025], 11th and 12th lines. No new matter is introduced by any of the amendments, and entry thereof is requested. Claims 1 - 10 are in the application. Reconsideration of the application, as amended, is requested.

Applicants' invention provides improved thermal performance in a PBGA, by employing a large heat spreader externally attached to the upper surface of the mold cap. Because according to the invention the heat spreader is externally affixed to the upper surface of the mold cap, the entire heat spreader is external to the mold cap, and is not embedded in the mold cap. In some embodiments (as illustrated for example in Applicants' Figs. 3, 4, 6) the periphery of the heat spreader extends down to the substrate and substantially covers the entire surface of the mold cap and the margins of the surface of the substrate adjacent the lower edges of the mold cap, but the heat spreader is free of attachment to the surface of the substrate.

The specific points raised by the Examiner will now be addressed.